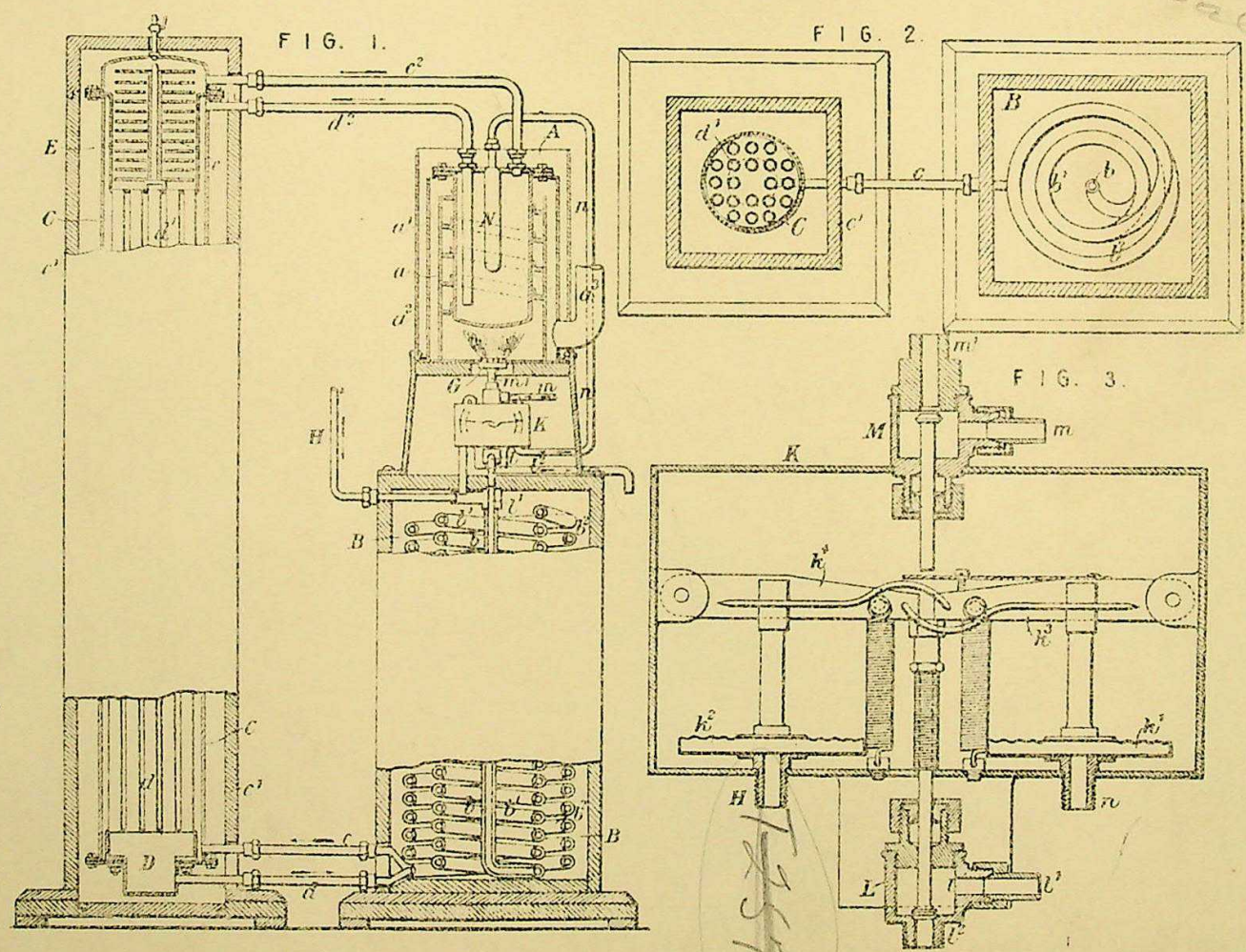


165-66

51/2
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700 spec
by heating
sterilizing water

A.D. 1898. Sep. 17. N° 19,782
MAICHE'S [L.D.] PROVISIONAL SPECIFICATION.



See Br. 5007 of 1897 210
Br. 19,426 of 1897 210-15
U.S. 538,599 257-11

BRITISH
PATENT
OFFICE

Br. 21 / 19782 of 1898
19,782
1898

Improvements in Apparatus for Sterilising Water.

COMPLETE SPECIFICATION.

Improvements in Apparatus for Sterilising Water.

We, MAICHE LIMITED, of No. 4, St. Mary Axe, in the City of London, do hereby declare the nature of this invention (as communicated to us from abroad by Louis Maiche, of 368, Rue St. Honoré, Paris, France, Engineer) and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

In the Specification No. 5007 of 1897 is described apparatus for sterilising water by heating it to a temperature sufficient to kill the bacilli, and subsequently cooling it, the process being conducted in closed vessels so that the cooled water retains in solution all the air and gases which it originally contained.

10 The present invention relates to improvements in the construction and arrangement of apparatus of this kind and more especially in appliances combined with it for automatically regulating the supply of water and the heat.

The construction and operation of the apparatus will be understood by reference to the drawings accompanying my Provisional Specification.

15 Fig. 1 is a vertical section and Fig. 2 is a sectional plan.

Fig. 3 is a section of the regulator drawn to an enlarged scale.

The apparatus comprises three main parts, a heater A, a casing B containing a double coil of concentric pipes, and a casing C containing a set of tubes.

20 The heater A is a vessel surrounded by a helical flue *a* within a partition *a*¹ so that the hot products of combustion from a gas burner G or other suitable source of heat, after ascending helically around *a* descend the annular space between *a*¹ and the outer casing *a*² and pass away by a chimney *a*³.

The double pipe consisting of two concentric pipes the one within the other has a descending limb *b* leading to the lowest convolution of an inner coil *b*¹ 25 which at the top is connected to the highest convolution of an outer coil *b*².

All the spaces in B between the coils and their convolutions are filled with material which is a bad conductor of heat such for instance as slag wool.

From the lowest convolution of the outer coil *b*² the concentric pipes lead separately the one *c* to the lower part of the vessel C, and the other *d* to a 30 chamber D which communicates by the vertical tubes *d*¹ with an upper chamber E in which are arranged a number of plates *e* having holes through them so situated that no hole in any plate is in the same vertical line with holes in the plate next above and below it.

The plates *e* are strung on a central rod with washers as distance pieces 35 between them and they can all be lifted out on removing the cover of E.

Instead of perforated plates suitable material in other forms may be used presenting interstices for passage of the water.

From the upper part of the vessel C a pipe *d*² leads to nearly the bottom of the heater A and from the chamber E a pipe *e*² connects to the top of the 40 heater A.

The vessel C is enclosed in a casing *c*¹ filled with material which is a bad conductor of heat.

Besides the main parts of the apparatus above described there is a regulator K for automatically regulating the heat and the supply of water.

45 It comprises two vessels *k*¹ *k*² covered by corrugated elastic diaphragms like those employed for aneroid barometers.

Each of those diaphragms is connected by a stem to a lever arm *k*³ *k*⁴ urged downwards by springs, the ends of these arms rest on the stem of a valve in a box L having an inlet *l* connected by a pipe *l*¹ to the inner of the concentric 50 pipes of the coil and having from its outlet a pipe *l*² by which the sterilised

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water is drawn off. On the arm k^3 is a blade spring immediately under the stem of a valve in a box M having an inlet connected to the gas supply m and an outlet connected by a pipe m^1 to the burner G. The vessel k^1 is connected by a pipe n to a closed vessel N immersed in the water in the heater A. The vessel k^2 is connected to the water supply pipe H. 5

All the pipe connections are preferably made with unions so as to be readily separable for cleaning or repair.

The apparatus operates as follows.—

Water supplied from an elevated cistern or from a water main through a suitable pressure reducing valve, and passing if desired through a filter, enters 10 by the pipe H the outer of the two concentric pipes and after flowing through the coils passes by the pipe c to the casing C in which it ascends around the tubes d^1 . From the top of C the water partially heated flows by the pipe d^2 to the heater A in which it is farther heated.

From A the heated water flows to the compartment E and in passing through 15 the holes of the plates e in a zig zag course, deposits on these plates, or their equivalent, matters suspended in the water, which continues its flow through the tubes d^1 down to D thence by the pipe d to the inner pipe of the coils in B, and being finally discharged by the pipe l^2 after passing through the valve box L and the pipe l^1 when a regulator is employed. Thus the cold water 20 while it passes through the coils in B and the vessel C becomes gradually heated while it cools the heated water, and the heated water conversely becomes gradually cooled while it heats the cold water, the interchange of heat being such that very little additional heating is required to be imparted in the heater A except such as is necessary to make up for losses by radiation and conduction. 25

The operation of the regulator K is as follows:—

When the temperature in the heater A exceeds a certain limit, steam generated in the vessel N which contains a little water passing by the pipe n to the vessel k^1 raises the diaphragm and the arm k^3 so as to close more or less the valve in the box M thus reducing more or less the gas flame. Preferably the gas pipe is 30 provided with a small by-pass so as to maintain a kindling light when the valve in M is quite closed. When the temperature falls too low, the arm k^3 descends depressing the stem of the valve in L and thereby more or less closing the outlet for the sterilised water.

The other part of the regulator acts only when the pressure of the water supply 35 happens to be too low in which case the arm k^4 descends depressing the stem of the valve in L and so more or less closing the outlet for the sterilised water until the pressure in the apparatus rises. Wires attached to the arms k^3 and k^4 point to graduations on scales which can be seen through the glazed front of the regulator. 40

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Water sterilising apparatus constructed and operating substantially as 45 described with reference to the drawings.
2. For water sterilising apparatus the automatic heat and flow regulator substantially as described and illustrated.

Dated this 17th day of June 1899.

ABEL & IMRAY,
Agents for the Applicants. 50